

WHAT IS CLAIMED IS:

1. A pin tool assembly for use with a pipette head, said pipette head having a plurality of pipettes projecting therefrom, said pin tool assembly comprising:

 a base plate having a plurality of apertures formed therethrough;

 a plurality of pins mounted respectively in said apertures of said base plate, said pins having tips that project from said base plate; and

 a transition cover mounted over said base plate, said transition cover comprising a plurality of engagement means formed thereon for releasable engagement with said pipettes of said pipette head, whereby said pipette head can be releasably engaged with said pin tool assembly for moving said pin tool assembly between a liquid source, a liquid destination and a discard location.

2. The pin tool assembly of claim 1, wherein said engagement means comprises a plurality of substantially tubular receptacles for releasable engagement with said pipettes.

3. The pin tool assembly of claim 2, wherein said pipettes each comprise a substantially frustum-shaped tip, said receptacles comprising tubular walls dimensioned for frictional engagement over said tips of said pipettes.

4. The pin tool assembly of claim 1, wherein each said pin comprises a substantially cylindrical shank and an enlarged head, said shank of each said pin being dimensioned for slidable engagement respectively in said apertures of said base plate, said head being cross-sectionally larger than said apertures for limiting movement of said pins in said apertures.

5. The pin tool assembly of claim 4, further comprising a weight plate disposed on said heads of said pins and between said base plate and said transition cover, said weight plate urging said heads of said pins toward said base plate while permitting movement of said heads of said pins upwardly away from said base plate in response to forces on said shanks of said pins.

6. The pin tool assembly of claim 1, wherein said transition cover comprises a plurality of resiliently deflectable flanges for releasably engaging said base plate.

7. The pin tool assembly of claim 1, wherein the base plate is unitarily molded from a plastic material.

8. The pin tool assembly of claim 1, wherein the transition cover is unitarily molded from a plastic material.

9. The pin tool assembly of claim 1, further comprising a docking tray for releasably receiving said base plate, said pins and said transition cover such that said docking tray protectively surrounds portions of said pins projecting from said base plate.

10. A pin tool apparatus comprising:

a pin tool assembly having a base plate with a plurality of apertures extending therethrough, a plurality of substantially identical pins, each said pin having a shank and an enlarged head, said shanks of said pins being slidably received in said apertures of said base plate, each said pin having a tip projecting beyond said base plate, said heads of said pins being cross-sectionally larger than said apertures for limiting sliding movement of said pins in said apertures, a weight plate mounted across said heads of said pins for urging said heads of said pins toward said base plate, and a transition cover releasably engaged with said base plate and covering said weight plate, a plurality of substantially tubular engagement surfaces formed on a side of said transition cover facing away from said base plate;

a docking tray releasably supporting said pin tool assembly, such that portions of said pins projecting from said base plate are protectively surrounded by said docking tray; and

a pipette head having means for mounting said pipette head to a robotic device and a plurality of pipettes dimensioned for releasable engagement with said engagement surfaces of said transition cover, whereby said pipette head can be engaged with said robotic device and can be releasably engaged with said transition cover for separating said pin tool assembly from said docking tray, moving said pin tool assembly to a source location for collecting liquid on said pins and subsequently depositing said liquid at a selected destination.

11. The pin tool apparatus of claim 10, wherein said pipettes of said pipette head each comprise a conically generated outer surface, said engagement surfaces of said transition cover each comprise a conically generated recess configured for releasable engagement with the conically generated outer surface of one of said pipettes.

12. The pin tool apparatus of claim 11, wherein the transition cover includes a plurality of generally tubular projections, said conically generated recesses being formed in said tubular projections.

13. The pin tool apparatus of claim 10, wherein the base plate is formed unitarily from a plastic material.

14. The pin tool apparatus of claim 10, wherein the transition cover is formed unitarily from a plastic material.

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15. A method for transferring liquid, said method comprising:

providing a pipette head with a plurality of conically tapered pipettes;

providing a plurality of pin tool assemblies, each said pin tool assembly having a plurality of pins projecting from said base plate and a transition cover mounted to said base plate, said transition cover comprising a plurality of receptacles configured for releasably engagement respectively with said pipettes of said pipette head;

moving said pipette head toward a selected one of said pin tool assemblies such that said pipettes releasably engage with said receptacles of said selected pin tool assembly;

moving said pipette head and said selected pin tool assembly such that said pins of said selected pin tool assembly enter into at least one source of said liquid;

moving said pipette head and said selected pin tool assembly away from said sources of liquid such that droplets of said liquid remain on said pins;

moving said pipette head and said selected pin tool assembly to a destination such that said droplets of said liquid on said pins are touched off at said destination;

moving said pipette head and said selected pin tool assembly away from said destination; and

separating said selected pin tool assembly from said pipette head, thereby enabling said pipette head to releasably engage a second of said pin tool assemblies.

16. The method of claim 15, further comprising the step of providing a plurality of docking trays, each said docking tray being configured for releasably supporting one of said pin tool assemblies, said method further comprising the step of supporting said pin tool assemblies in said docking trays such that said pins of said pin tool assemblies are protectively enclosed by said docking trays, said step of engaging said pipettes with said receptacles is carried out while said selected pin tool assembly is releasably supported in the respective docking tray, said steps of moving said pipette head and said selected pin tool assembly comprising separating said pin tool assembly from said docking tray.

17. The method of claim 16, further comprising the step of returning said selected pin tool assembly to the respective docking tray prior to separating said pipette head from said selected pin tool assembly.

18. The method of claim 15, wherein the step of moving said pipette head and said select pin tool assembly away from said liquid comprises collecting droplets of approximately 10 nL on each said pin.